NOTE IV.

ON A REMARKABLE SYLLIS-BUD WITH EXTRUDIBLE SEGMENTAL ORGANS.

BY

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(Plate 1, and plate 2, fig. 1).

Among a number of pelagic Annelids, collected in the Malayan Archipelago by Mr. D. S. Hoedt, I met with some fragments of a *Syllis*-species, characterized as well by its large orange-coloured eyes, as by a series of distinct brown spots on each side of the body. The largest fragment has a length of about 13 m.m., and is composed of 47 segments; another specimen, that seems to have an anal segment, measured only 9 m.m., the number of its segments amounting to 41.

The head shows a deeply notched anterior margin, and is furnished dorsally and ventrally with two eyes of considerable size, resembling those of the *Alciopidae*; no cephalic processes are visible, neither tentacles nor palpi. Each foot (fig. 1) presents a dorsal and a ventral cirrus. The dorsal cirri are articulated and of a very different length, being in one segment thrice, in the other only once as long as the foot; the largest number of its articulations is 28. The ventral cirrus is smooth, acute conical, projecting somewhat beyond the apex of the foot. The feet are furnished with a fascicle of 4 to 6 bristles of the type, common amongst the Syllidae, with an elongated terminal appendage, bifid at the tip and beset with short hairs at the inner border (fig. 2*a*); the length of this terminal piece is not the same in all bristles, being in some of them one third longer as in others. Besides, the setigerous region of the foot possesses a dorsal tuft of long, translucent, paddle-shaped epitocous bristles; the tip of these ordinarily is bend and sometimes has a fimbriated appearance (fig. 2*b*).

The condition of the anal region is open to doubt; in one specimen I observed an anal segment without feet or terminal cirri, but with wing-shaped processes along its lateral sides (fig. 3).

In the base of each foot, except in that of the first segment, a large dark-brown coloured sac is situated, which appears to be capable of being extruded through a small opening at the ventral surface; at least in some segments this sac was nearly totally everted, whereas in others I found only a part of it turned outward (fig. 4). The largest extruded pouch measures about 0.24 m.m. in length. Not doubting that these bodies represented the segmental organs, I tried to find out the internal openings of them. In consequence of the transparency of the body I succeeded to recognize the internal mouth of the first segmental organ, situated in the second segment (fig. 5). This mouth has the shape of a rather large, shallow funnel, corresponding by a short, broad duct with the body of the pouch. The wall of this duct appeared to be composed of cells and its external surface shows a thin layer of pigment; in the posterior region of the body the segmental duct was therefore recognizable as a thin brown stripe. In transverse sections (fig. 6) each segmental pouch appeared to have a somewhat renal shape, being provided with a notch at its base; this basal region usually is not pigmented, the remaining portion of the sac being covered with a thick layer of dark-brown pigment, which seemed to be enclosed in an external layer of polygonal cells. The internal surface (fig. 7) of the pouch is covered with a layer of high, cylindrical cells with a granular protoplasma and of a glandular appearance; though in some of them I could recognize a very distinct oval nucleus, the limits of the cells could not always be distinguished. Between the external and the internal layer of cells a hyaline membrane is to be found. The internal cavity of the pouch is filled up with a mass of small granules, which are very darkly stained by the alum carmine. At first I presumed that this mass might consist of spermatozoa, which often have been met with in the nephridia of the Syllidae; however the matter could not be fixed, because I found no sexual products in the body cavity, and many of those granules appeared to me to extend into the interior of the epithelium cells, and therefore should be considered as the product of secretion of these cells.

I regret that I cannot enter more fully into the minute structure of these curious bodies, the material being very scanty and not in too best a state of preservation, after having been for about 25 years in alcohol.

In the figure 8 I have given two diagrammatical views of a segmental organ, to illustrate the supposed manner of extrusion of this organ; I presume that by the pressure of the fluid of the body cavity the largest portion of the segmental pouch is everted outward, while a small portion, fixed by the internal duct, remains into the body cavity. A muscular fascicle, which I believe could be observed sometimes, may have the function to withdraw the pouch and bring her back in the previous situation. Of course it remains somewhat questionable, whether the extruding of the pouches is a normal habit of the living animal, or whether it may be caused by the heavy contraction of the body, as it was plunged in the alcohol. However the last supposition seems not very probable to me, because in that case undoubtedly tearing of the internal parts should have taken place, which I could not observe. Moreover it may be remembered that this is not the only example of extrudible pouches observed in Annelids, for Ehlers found in the feet of several *Glycera*-species bladder-shaped bodies, capable of being extruded, which he believes to be respiratory organs [1]).

The eyes (fig. 9) of our worm, though not so highly developed as those of the Alciopidae, however seem to have a more differentiated structure as the large eyes of *Genetyllis oculata* described by Mac Intosh [2]). There is no lens, but the total eye-cavity is occupied by a vitreous body, composed of exquisitely delicate fibrils, which eradiate from the fundus of the eye to the corneal surface. Immediately within the vitreous, and not always distinctly separated from it, is a layer of short fibres, thicker as those of the vitreous and darker stained, which undoubtedly corresponds to the rod-layer of the retina in the eye of the Alciopidae. Outside of the rod-layer we have a layer of orange-coloured pigment, resting on the outer layer of the retina, which contains numerous nuclei, while the cells are not well-defined.

Concerning the systematical position of these *Syllis*-specimens, there can be no doubt that they are originated by budding; this may be concluded from the presence of bristles in the first segment of the body, from the total absence of tentacular processes on the head, from the structure of the alimentary tract, having no proper pharynx and proventriculus. This may also be presumed from the extraordinary development of the segmental organs, for we know from Ehlers' researches, that in the posterior segments of the body of the Syllidae, which contain the generative products, the segmental organs become much enlarged [3]).

Albert mentions also about the segmental organs of the swimming bud of *Haplosyllis spongicola* Gr., that their middle region acquires a glandular appearance and much

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1) Die Borstenwürmer, p. 659 and 676.

2) Challenger Report, Zoology, Vol. XII, p. 170, pl. XXXIII, A, figs. 1—8.

3) loc. cit. p. 231.

increases in size, occupying accordingly a good deal of the body cavity [1]).

Segmental organs coloured by a dark pigment seem to have been observed also by Grube in *Odontosyllis hyalina* [2]), a worm which probably also must be considered as a bud; here he found in the posterior region of the body, situated on each side of the nerve-cord, black coiled tubes, opening on the ventral side. However by the shape of its bristles, and its smooth dorsal cirri, this species is quite different from our specimens.

1) Mittheil. aus der Zool. Station zu Neapel, Bd. VII, p. 20.

2) Beiträge zur Anneliden-fauna der Philippinen, p. 129. Taf. VII, fig. 1.

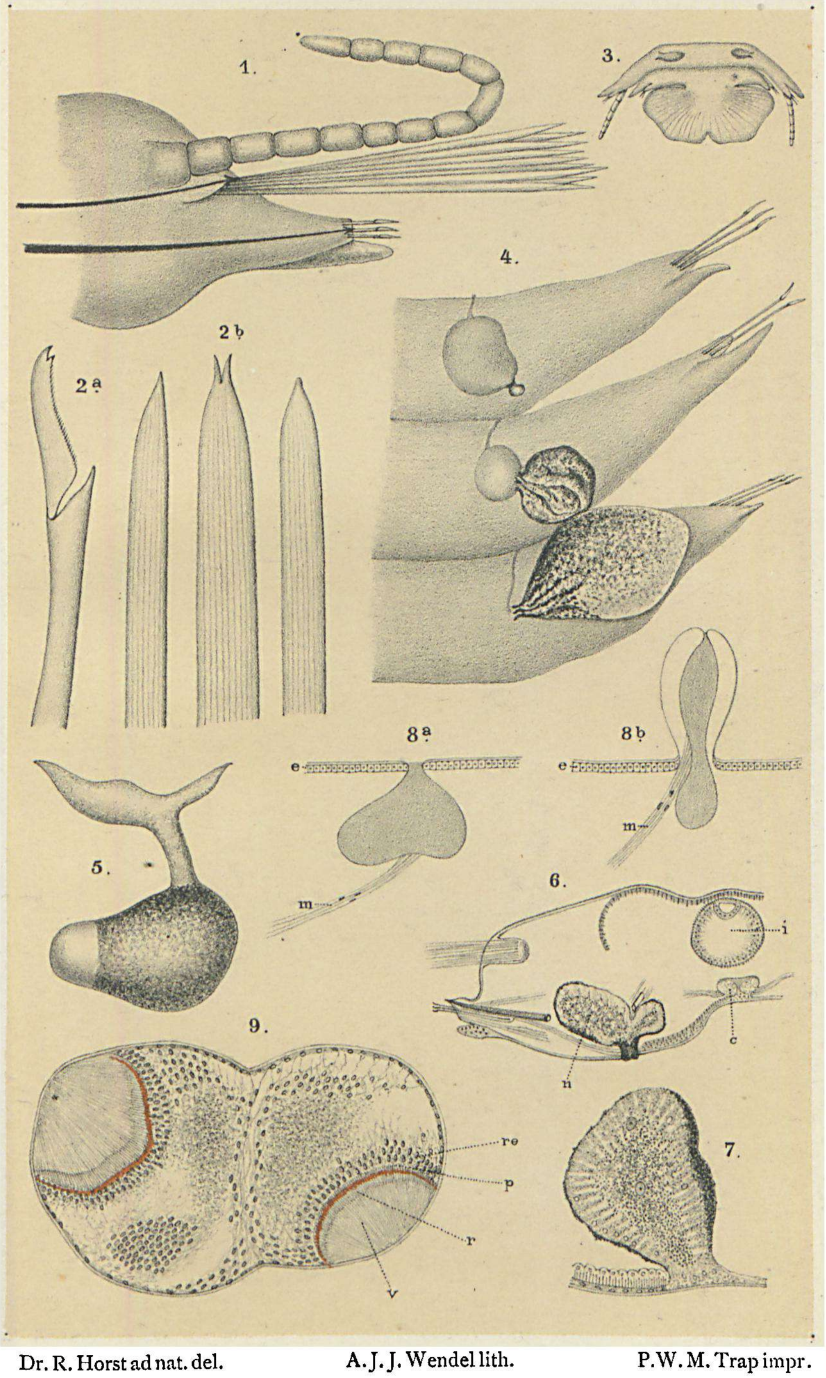
EXPLANATION OF THE PLATES.

PLATE 1.

Fig. 1. Foot of the *Syllis*-bud. × 90 diam.
„ 2. *a.* Ventral bristle; *b.* tips of three dorsal epitocous bristles. Enlarged.
„ 3. Anal region of one specimen. × 36 diam.
„ 4. Ventral view of three feet, showing the different state of extrusion of the segmental organs. × 36 diam.
„ 5. Segmental organ of the second segment with its funnel. Highly enlarged.
„ 6. Lateral half of a transverse section of the body, showing the position of the segmental organ;
c. nerve-cord; *i.* intestine; *n.* segmental organ.
„ 7. Transverse section of a segmental organ. × 90 diam.
„ 8. Diagrammatical view of a segmental organ: *a* in state of rest;
b. in state of extrusion; *e.* epidermis; *m.* muscle.
„ 9. Transverse section (not quite vertical) through the head, showing one dorsal and one ventral eye;
p. pigment-layer of retina; *r.* rod-layer of the same; *re.* layer of retinal cells; *v.* vitreous body. × 90 diam.

PLATE 2.

Fig. 1. Ventral view of the head and anterior region of a *Syllis*-bud, showing the extruded segmental organs. × 10 diam.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Malayan Syllis-bud.

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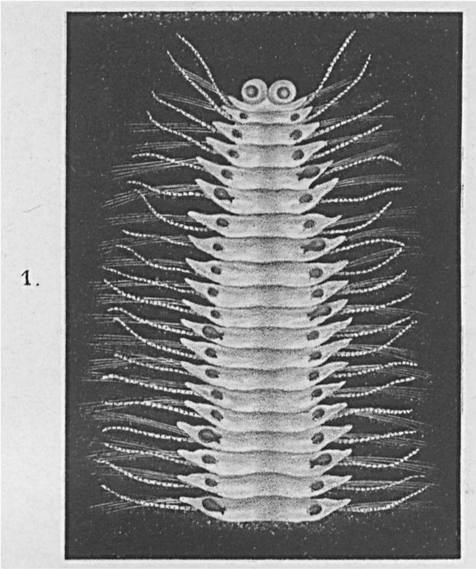

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1. Malayan Syllis-bud.